CLAIMS

We claim:

1. A transformed host cell that comprises one or more genetic construct that comprises SEQ ID NO: 1, SEQ ID NO: 2, and SEQ ID NO:3.

2. The transformed host cell of claim 1, wherein said transformed host cell has been transformed with multiple genetic constructs.

3. The transformed host cell of claim 2, wherein said multiple genetic constructs contain SEQ ID NO: 1, SEQ ID NO:2, SEQ ID NO: 3, polynucleotide fragments of SEQ ID NOs: 1-3, or combinations of polynucleotide fragments of SEQ ID NOs 1-3.

4. The transformed host cell of claim 1, wherein said host cell has been transformed with one or more genetic constructs that provide a combination of polynucleotide fragments of SEQ ID NOs: 1, 2, and 3, wherein said combination of polynucleotide fragments provide a biosynthetic pathway for the production of albicidin or an albicidin-like antibiotic.

5. A genetic construct comprising at least one polynucleotide sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, and SEQ ID NO: 3.

6. A method of making an antibiotic comprising the culturing of a transformed host cell according to claim 1, 2, 3, or 4 under conditions that allow for the production of said antibiotic.

7. The method according to claim 6, further comprising the isolation of said antibiotic.

8. An isolated or purified polynucleotide comprising:

(a) a polynucleotide sequence selected from the group consisting of SEQ ID NO: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25;

(b) a polynucleotide encoding a polypeptide selected from the group consisting of SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47;

(c) a polynucleotide that is complementary to a polynucleotide selected from the group consisting of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25;

(d) a polynucleotide that is complementary to a polynucleotide encoding a polypeptide selected from the group consisting of SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47; or

(e) a polynucleotide that is at least 70% homologous to: (1) a polynucleotide

selected from the group consisting of SEQ ID NO: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25; (2) a polynucleotide sequence encoding a polypeptide selected from the group consisting of SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47; (3) a polynucleotide that is complementary to a polynucleotide encoding a polypeptide selected from the group consisting of SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47; (3) a polynucleotide that is complementary to a polynucleotide sequence selected from the group consisting of SEQ ID NO: 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, and 25;

(f) a polynucleotide sequence encoding a variant of a polypeptide selected from the group consisting of SEQ ID NOs: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47, wherein said variant has at least one of the biological activities associated with the polypeptides of SEQ ID NOs: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47;

g) a polynucleotide sequence encoding a fragment of a polypeptide selected from the group consisting of SEQ ID NOs: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47 or a fragment of a variant polypeptide of SEQ ID NOs: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47;

h) a polynucleotide sequence encoding multimeric construct comprising a polynucleotide as set forth in (a), (b), (c), (d), (e), (f), or (g);

(i) a polynucleotide that hybridizes under low, intermediate or high stringency with a polynucleotide sequence as set forth in (a), (b), (c), (d), (e), (f), (g), or (h);

j) a genetic construct comprising a polynucleotide sequence as set forth in (a), (b), (c), (d), (e), (f), (g), (h), or (i);

k) a vector comprising a polynucleotide sequence as set forth in (a), (b), (c), (d), (e), (f), (g), (h), or (i); or

(l) a promoter operably linked to a polynucleotide sequence as set forth in (a), (b), (c), (d), (e), (f), (g), (h), or (i).

9. A recombinant cell comprising a polynucleotide sequence according to claim 8.

10. The recombinant cell of claim 9, wherein said cell is a plant cell.

11. The recombinant cell of claim 9, wherein said cell is bacterial.

12. The recombinant cell of claim 9, wherein said cell is eukaryotic.

13. The recombinant cell of claim 10, wherein said plant cell comprises seed

propagative materials, or plant parts.

14. A method of producing a protein comprising the steps of expressing a polynucleotide according to claim 8 in a host cell under conditions that allow for the expression of said polynucleotide.

15. The method according to claim 14, further comprising the isolation of said protein.

16. A method of producing a polyketide carrying para-aminobenzoic acid and/or carbamoyl benzoic acid by inserting at least one DNA Fragment of Claim 8 that encodes a polyketide synthetase (PKS) into a cell and causing the cell to express the encoded PKS protein under conditions such that the PKS functions to produce a polyketide carrying either a para-aminobenzoic acid or a carbamoyl benzoic acid or both.

17. A method of activating non-proteinogenic amino acids for incorporation into peptides or polyketides by inserting at least one DNA Fragment of Claim 8 that encodes a polyketide synthetase (PKS) into a cell and causing the cell to express the encoded PKS under conditions such that the PKS activates said non-proteinogenic amino acids.

18. The method according to claim 17, wherein said non-proteinogenic amino acids are paraminobenzoic acid or carbamoyl benzoic acid.

19. A polypeptide comprising:

(a) SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47;

(b) a heterologous polypeptide sequence fused, in frame, to a polypeptide comprising SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47;

(c) a fragment of SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47, wherein said fragment exhibits at least one biological function of the polypeptide of SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47;

(d) a variant having at least 70% homology to a polypeptide comprising SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47, wherein said variant exhibits at least one biological function of the polypeptide comprising SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47;

20. An isolated and purified antibiotic produced by a process that includes at least three proteins coded by DNA sequences of claim 8 in combination with additional

enzymes that modify the product to provide a non-naturally occurring Albicidin-like product having at least one of the useful properties reported for albicidin.

21. The antibiotic or antibiotics of claim 20 having at least one of the general structures illustrated in Figure 11.

22. An antibiotic produced by the process of expressing the DNA of one or more of the genes included in the Albicidin Biosynthetic Gene Clusters of Claim 8 in a genetically modified host cell sustained in a culture media, and thereafter separating the antibiotic from the host cell and culture media.

23. A process for producing an antibiotic that comprises modifying a host cell to enhance expression of a polynucleotide according to claim 8 comprising the insertion of expression enhancing DNA into the genome of a Xanthomonas albilineans strain, Escherichia coli strain, or other Albicidin producing microbial strain, in a position operative to enhance expression of the enzymes of the Albicidin Biosynthetic Gene Clusters, culturing the modified host cell to produce an antibiotic and isolating the antibiotic.

24. An isolated purified antibiotic having at least 4 of the structural elements illustrated in Figure 11, and an elemental composition of $C_{40}H_{35}N_6O_{15}$.

25. A method of protecting a plant against damage from albicidin that comprises applying an agent that blocks expression at least one gene in the Albicidin Biosynthetic Gene Clusters to the plant to be protected.

26. A method of obtaining agents useful in blocking expression of albicidin by screening materials against a modified host cell line that expresses a polynucleotide according to claim 8 and selecting for materials that stop or decrease albicidin production.

27. A method of protecting a plant against phytotoxic damage from an antibiotic that comprises inserting into the plant and operably expressing at least one resistance gene from the polynucleotides according to claim 8 in the plant to be protected.

28. The recombinant cell of claim 9, wherein said cell has been transformed with at least one polynucleotide sequence comprising SEQ ID NO: 1, 2, or 3.

29. The recombinant cell of claim 28, wherein said cell has been transformed with at least two of said polynucleotide sequences.

30. The recombinant cell of claim 28, wherein said cell has been transformed with SEQ ID NO: 1, SEQ ID NO: 2 and SEQ ID NO: 3.